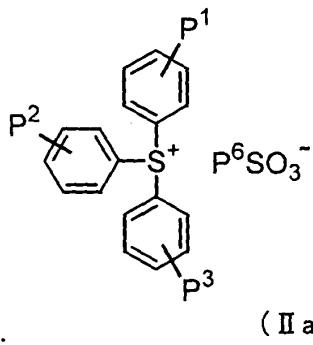


What is claimed is:

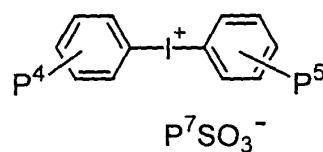
1. A positive resist composition comprising
- (A) a resin which itself is insoluble or poorly soluble in an alkali aqueous solution but becomes soluble in an alkali aqueous solution by the action of an acid, wherein the content of halogen atoms in the resin is 40% by weight or more, at least one of structural units constituting the resin is a structural unit having an alicyclic hydrocarbon skeleton, and the structural unit having an alicyclic hydrocarbon skeleton contains therein at least one group rendering the resin soluble in an alkali aqueous solution by the action of an acid, and at least one halogen atom, and a carbon in the alicyclic hydrocarbon skeleton may be substituted by an oxygen, and
- 10 (B) (a) an acid generator comprising a sulfonium salt of the formula (I)
- $$\begin{array}{c} Q^1 \\ | \\ Q^2-S^+-CH-Q^4 \\ | \\ Q^3 \end{array} \text{O} \quad Q^5SO_3^- \quad (I)$$
- 15 wherein Q^1 and Q^2 each independently represent alkyl having 1 to 6 carbon atoms or cycloalkyl having 3 to 10 carbon atoms, or Q^1 and Q^2 bond to form divalent acyclic hydrocarbon having 3 to 7 carbon atoms which form a ring together with the adjacent S^+ , and at least one $-CH_2-$ in the divalent acyclic hydrocarbon may be substituted by $-CO-$, $-O-$ or $-S-$; Q^3 represent hydrogen, Q^4 represents alkyl having 1 to 6 carbon atoms, cycloalkyl having 3 to 10 carbon atoms or phenyl optionally substituted by alkyl having 1 to 6 carbon atoms, or Q^3 and Q^4 bond to form 2-oxocycloalkyl together with the adjacent $-CHCO-$, and
- 20

$Q^5SO_3^-$ represents organic sulfonate ion, and

(b) at least one onium salt selected from the group consisting of a triphenylsulfonium salt of the formula (IIa) and a diphenyliodonium salt of the formula (IIb)



5 (II a)



(II b)

wherein P^1 , P^2 , P^3 , P^4 and P^5 each independently represent hydrogen, hydroxyl, alkyl having 1 to 6 carbon atoms or alkoxy having 1 to 6 carbon atoms, and $P^6SO_3^-$ and $P^7SO_3^-$ each independently represent organic sulfonate ion.

2. The positive resist composition according to Claim 1 wherein Q^1 and
10 Q^2 bond to form divalent acyclic hydrocarbon having 3 to 7 carbon atoms which form a ring together with the adjacent S^+ , and at least one $-CH_2-$ in the divalent acyclic hydrocarbon may be substituted by $-CO-$, $-O-$ or $-S-$.

3. The positive resist composition according to Claim 1 wherein Q^5 , P^6 and P^7 each independently represent alkyl having 1 to 8 carbon atoms,
15 perfluoroalkyl having 1 to 8 carbon atoms, aromatic group having 6 to 12 carbon atoms or camphor group.

4. The positive resist composition according to Claim 1 wherein the weight ratio of (b)/(a) is 9 to 1/9 wherein (a) is a sulfonium salt of the formula (I), and (b) is at least one onium salt selected by from the group consisting of a

triphenylsulfonium salt of the formula (IIa) and diphenyliodonium salt of the formula (IIb).

5. The positive resist composition according to Claim 1 wherein the content of the structural unit having an alicyclic hydrocarbon skeleton which 5 contains therein at least one group rendering the resin soluble in an alkali aqueous solution by the action of an acid, and at least one halogen atom, is 15 to 50 mol % in the total structural units in the resin.

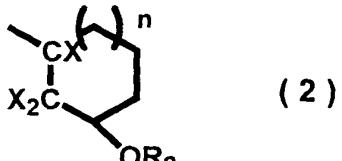
6. The positive resist composition according to Claim 1 wherein the alicyclic hydrocarbon skeleton is a skeleton of the following formula (1):



10

wherein R₂ and R₃ bond to form an alicyclic hydrocarbon ring together with adjacent carbon atom, the alicyclic hydrocarbon ring formed by R₂, R₃ and the carbon atom bonds to at least one group containing a group rendering a resin soluble in an alkali aqueous solution by the action of an acid, and bonds to at 15 least one halogen atom; R₁ represents a hydrogen atom, halogen atom or aliphatic hydrocarbon group.

7. The positive resist composition according to Claim 6 wherein the cyclic hydrocarbon skeleton of the formula (1) is an alicyclic hydrocarbon skeleton of the formula (2):



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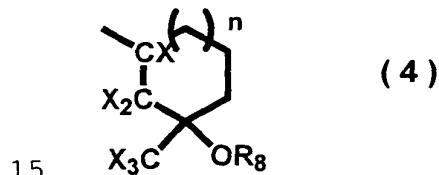
wherein X represents a halogen atom, R₈ represents a hydrogen or an acid-unstable group dissociating in the presence of an acid, and n represents 0 or 1.

8. The positive resist composition according to Claim 7 wherein the
 5 alicyclic hydrocarbon skeleton of the formula (2) is an alicyclic hydrocarbon skeleton containing a partial structure of the formula (3):



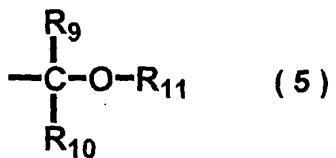
wherein C is a carbon atom forming an alicyclic hydrocarbon skeleton; R₇ represents an alkyl group having 1 to 6 carbon atoms substituted with at least one 10 halogen atom or alicyclic hydrocarbon group substituted with at least one halogen atom; and R₈ has the same meaning as described above.

9. The positive resist composition according to Claim 8 wherein the cyclic hydrocarbon skeleton of the formula (2) is an alicyclic hydrocarbon skeleton of the formula (4):



wherein X, R₈ and n have the same meanings as described above.

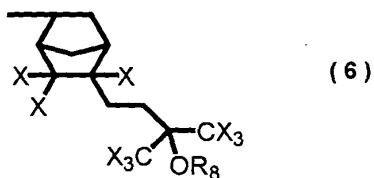
10. The positive resist composition according to Claim 9 wherein R₈ is a group of the formula (5):



- wherein R_9 and R_{10} each independently represent an alkyl group having 1 to 14 carbon atoms or a hydrogen atom, the alkyl group may have at least one group selected from the group consisting of halogen atoms and alicyclic hydrocarbon groups; R_{11} represents an alkyl group having 1 to 14 carbon atoms, alicyclic hydrocarbon group, lactone ring group or aromatic hydrocarbon group, the alkyl group may have at least one substituent selected from the group consisting of halogen atom, alicyclic hydrocarbon group and aromatic hydrocarbon group, the alicyclic hydrocarbon group, lactone ring group and aromatic hydrocarbon group in R_{11} may each independently have at least one substituent selected from the group consisting of halogen atoms and alkyl groups.

11. The positive resist composition according to Claim 10 wherein in the formula (5), R_9 and R_{10} represent a hydrogen atom, and R_{11} represents an ethyl group.

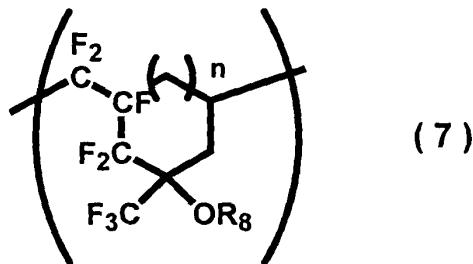
12. The positive resist composition according to Claim 6 wherein the cyclic hydrocarbon skeleton of the formula (1) is a skeleton of the formula (6):



wherein X and R_8 have the same meanings as described above.

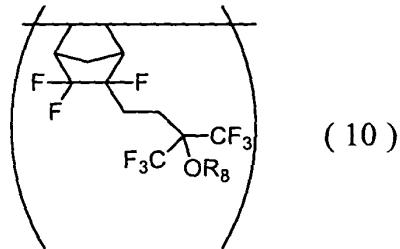
13. The positive resist composition according to Claim 1 wherein the halogen atom is a fluorine atom.

14. The positive resist composition according to Claim 1 wherein the structural unit having an alicyclic hydrocarbon skeleton is a structural unit of the formula (7):



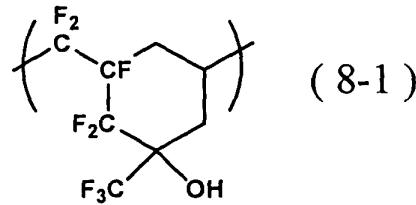
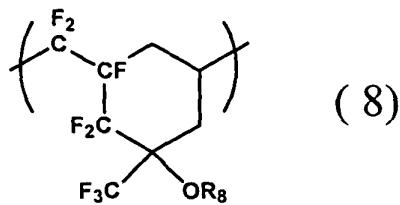
5 wherein n and R₈ have the same meanings as described above.

15. The positive resist composition according to Claim 1 wherein the structural unit having an alicyclic hydrocarbon skeleton is a structural unit of the formula (10):



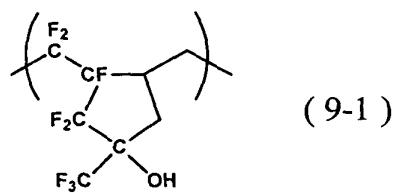
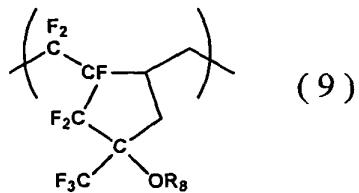
10 wherein R₈ has the same meaning as described above.

16. The positive resist composition according to Claim 1 wherein the resin is a copolymer containing a structural unit of the following formula (8) and a structural unit of the following formula (8-1):



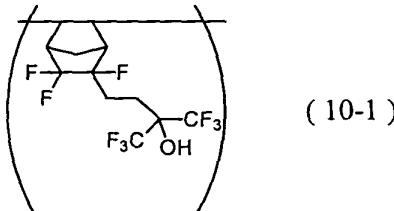
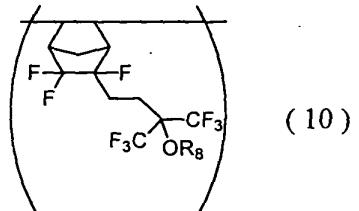
wherein R₈ has the same meaning as described above.

17. The positive resist composition according to Claim 1 wherein the resin is a copolymer containing a structural unit of the following formula (9) and
5 a structural unit of the following formula (9-1):



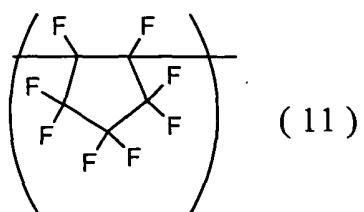
wherein, R₈ has the same meaning as described above.

18. The positive resist composition according to Claim 1 wherein the resin is a copolymer containing a structural unit of the following formula (10) and a structural unit of the following formula (10-1):
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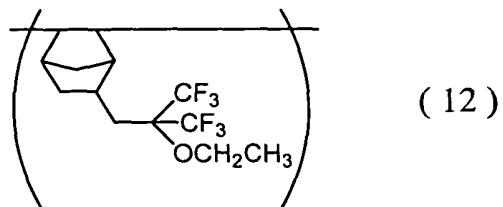


wherein, R₈ has the same meaning as described above.

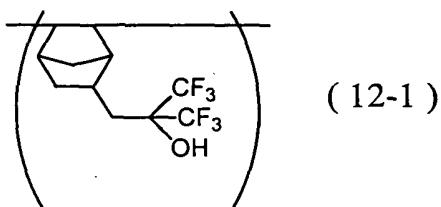
19. The positive resist composition according to Claim 1 wherein the resin is a copolymer containing a structural unit of the following formula (11), a structural unit of the following formula (12) and a structural unit of the following formula (12-1):
15



(11)



(12)



(12-1)

20. The positive resist composition according to Claim 1 which further comprises a basic nitrogen-containing organic compound as a quencher.